LiDAR for the Northeast
Draft Concept Proposal - Version 1.4 – 3/30/09

Topographic data generally available for the Northeast are limited to the contour lines from 1:24,000 USGS topographic maps and 30 and 10 meter digital elevation models, which are inadequate to support key analyses. While there are patches of higher resolution elevation data along the coast, the areas of collection are often disjunct and therefore difficult to use for estuarine or run-off applications. Most state and local applications including site development, flood plain mapping and transportation planning require 2 foot and 4 foot land contours.

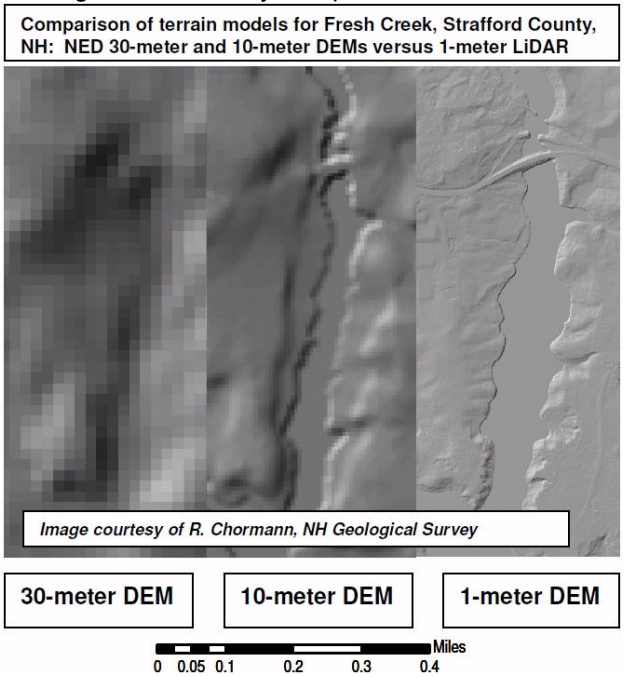
This concept proposal will set in motion a collaborative program initiated and operated by the Northeast states in cooperation with USGS, FEMA and other federal partners to develop new, high resolution topographic data for the entire region. This program will be designed to meet the regional needs of state, local and regional partners, including those articulated through workshops held by the Northeast Regional Ocean Council (NROC). NROC has identified LiDAR data collection as a top priority to support planning for and responses to coastal hazards. Additionally, coastal elevation data will help states address ecosystem health issues associated with forecasted sea level rise. This program will be a multi-phase effort spanning 4 to 6 years and providing new data for the entire region. Existing high resolution topographic data will be inventoried and used in the program if it meets current standards and can be integrated seamlessly into the overall database.

Phase I Project Description **Estimated Amount**: $6.2 Million

This proposal will provide topographic data that meets the basic National Map and FEMA needs for all coastal counties in the Northeast. The collaborative program (a multi-phased project) will also include “buy up” options for areas where greater accuracies are required.

There are compelling reasons to provide regional coverage for coastal New England, which covers six states and over 10,500 miles of coastline. While this area is home to over 22 million people and 8 million households, it is also a region with many historical resources relating to our Nation's colonial days and The Revolution. It contains the cities of New York, Boston, Bridgeport, Portland, Portsmouth, and Providence. Natural wonders abound including the Gulf of Maine and Long Island Sound, Hammonasett Beach, Block Island, Cape Cod, Odiorne Point, Rachel Carson National Wildlife Refuge and Acadia National Park, to name a few. The region has an aging infrastructure of highways, railroads and transmission lines sited near the shore’s edge. The entire region is threatened as sea levels continue to creep upward and hurricanes and winter nor’easters bring the constant threat of coastal flooding and destruction.

One tool that can greatly help response planning, especially in the context of flooding and storm damage prevention, is LiDAR (light detection and ranging), which uses a laser beam to measure the vertical height of the landscape, yielding data with an accuracy far beyond what is currently available. For example, current floodplain maps in this region are often created with data measured in 20-foot increments and with vertical accuracies in the range of 10 feet. LiDAR data are capable of delivering data that measure in 1-foot increments with vertical accuracies of 15 centimeters or better, allowing much greater accuracy and precision when estimating flood zones.



LiDAR Applications

- There are many other applications for LiDAR aside from flood zone mapping, including:
- planning of transportation projects, where having existing LiDAR removes the need for initial surveying
- orthorectification of aerial photos, where LiDAR can provide improved topographic models which then support more accurate aerial photos
- snow pack and water runoff modeling
- habitat and vegetation modeling, where elevation, slope, and aspect measurements play a key role
- land cover mapping, where return differences can indicate canopy height, and intensity images can determine the 'solidness' of a surface
- land protection prioritization applications
- recreational applications such as routing of trails
- coastal geology applications, including dunes, bluff erosion, and shoreline change

- 3D visualization
- Research associated with dam removal, sediment transport and changes in coastal characteristics, habitats for anadromous fish and perched freshwater habitats in coastal settings
- air movement modeling including air quality applications and wind farm sites
- cultural history applications, such as identifying historical sites
- predicting flood inundation areas
- evacuation planning
- estimating slope stability
- hydrographic modeling of hazardous spills
- ice jam studies
- forest canopy models for invasive species studies
- cell phone tower placement studies
- hazardous air plume modeling

Specifications

We propose to collect LiDAR for all coastal counties in the northeast, with minimum specifications that include:

	Towns w/elevations < 10m	**Other towns**
Nominal point spacing	1 meter	2 meter
Vertical accuracy	9.25cm vertical 67cm horizontal	15cm vertical 1m horizontal
Contour lines	1-foot	1.65-foot (half-meter)
DEM resolution	1 meter	2meter

All areas would include metadata, intensity data, mass points (LAS 1.2 format), first/last returns and one intermediate return, and breaklines.

Geographic Extent

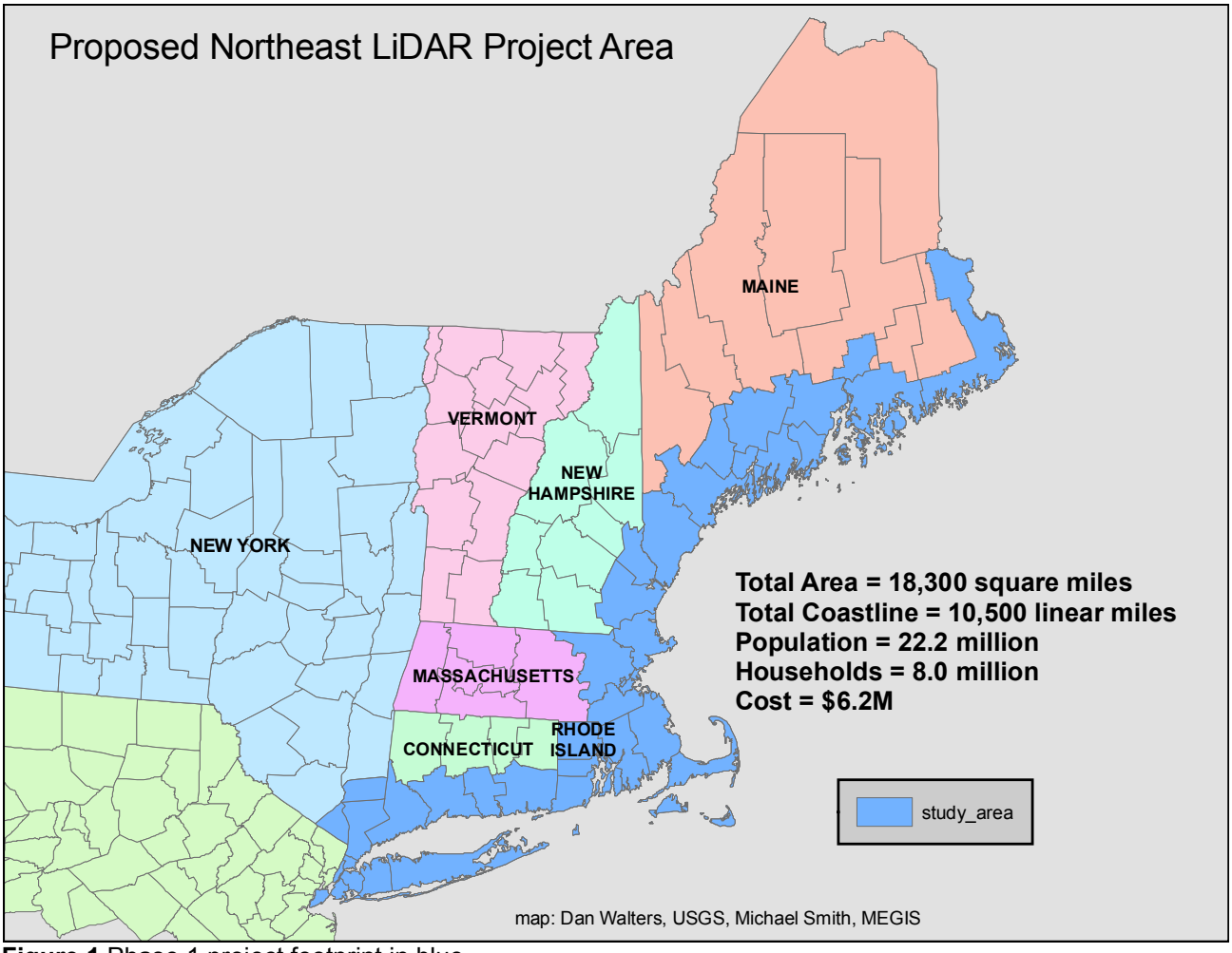


Figure 1 Phase 1 project footprint in blue

This proposal was developed by Michael Smith, MEGIS, and Dan Walters, USGS, with input from Fay Rubin, GRANIT-NH. Questions? michael.smith@maine.gov